

RESERVOIR ENGINEERING FOR OTHER DISCIPLINES

RSE034

COURSE OVERVIEW

This course gives the non-reservoir engineer a better understanding of reservoir engineering practices and limitations. The course is designed to provide a good understanding of reservoir engineering processes, the required data, and the limitations on the engineers' analysis and interpretations. The course also provides persons who are already well trained in the other upstream petroleum industry technical disciplines with an understanding of the current state-of-the-art practice of reservoir engineering.

COURSE OBJECTIVES

By the end of this course, participant will be able to:

- Utilize the tools and techniques of reservoir engineering.
- Understand the principles and processes of reservoir engineering.
- Analyze and interpret reservoir properties such as structure, fluid contacts, water saturation, and pressure.
- Evaluate rock properties including porosity, permeability, and capillary pressure.
- Comprehend the phase behavior of reservoir fluids and their properties.
- Calculate initial hydrocarbons in place using volumetric methods.
- Address uncertainty in reservoir engineering using probabilistic methods.
- Apply material balance methods to oil and gas reservoirs.
- Assess fluid flow and well performance in various flow regimes.
- Understand immiscible displacement processes and their impact on reservoir performance.
- Identify different reservoir types and drive mechanisms.
- Gain knowledge of reservoir simulation and its applications.
- Develop field development plans and forecast well count and rates.

WHO SHOULD ATTEND

Engineers and geoscientists now working in an asset environment where they need to better understand the practices and limitations of the methods and procedures employed by the reservoir engineers with whom they work. Participants should have three or more years of technical experience in the upstream petroleum industry.

COURSE DURATION

5 Working Days

COURSE OUTLINES

Day 1

- Pre course evaluation.
- Utilize the tools and techniques of the reservoir engineer
- Principles of reservoir engineering
- Developing reservoir
- Well performance
- Asset management options
- Distribution of Reservoir Properties:
 - Structure
 - Fluid contacts
 - Water saturation
 - Pressure

Day 2

- Rock Properties
 - Porosity
 - Permeability
 - Capillary pressure
 - Relative permeability
- Fluid Properties
 - Phase behavior of reservoir fluids
 - Properties of gas, oil, and water
 - PVT Sampling
 - PVT laboratory reports
- Volumetric Calculation of Initial Hydrocarbons in Place:
 - Oil in place
 - Gas in place
- Addressing uncertainty using probabilistic methods
- Reserve booking practices
- Reservoir recovery efficiencies

Day 3

- Material Balance Methods:
 - Oil reservoir material balance
 - Havlena Odeh method

- Gas material balance
 - Volumetric
 - Compaction
 - Water drive
 - Compartmentalized reservoirs
- Fluid flow and well performance:
 - Radial and linear flow,
 - Transient
 - Pseudosteady state
 - Steady state flow regimes
 - Productivity of vertical and horizontal wells
- Aquifer influx

Day 4

- Immiscible Displacement
 - Fluid displacement process
 - Fractional flow
 - Buckley Leverett
 - Welge
 - Water under running
 - Gas overriding
- Coning and Cusping
 - Description of process
 - Critical rates
 - Using horizontal wells
- Reservoir Types and Drive Mechanisms
 - Gas reservoirs - volumetric, water drive and compaction drive
 - Oil reservoirs - solution gas drive, water drive, water flood, gas cap expansion
 - Combination drive
 - Naturally fractured
 - Critical reservoir fluid reservoirs

Day 5

- Reservoir Simulation
 - Why simulate
 - Types of simulators
 - Simulation models

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- Setting up a simulation model
- Conducting a simulation study
- Field Development Planning
 - Characteristics, planning tools
 - Deliverability issues
 - Determining a well count and rate forecast
- Post course evaluation.

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